

CLAIMS

1. A method of fabricating a ceramic article comprising:
forming a molded component comprising a ceramic powder comprising silicon carbide; and
sintering the molded component at about 2200° to about 2500° C to produce a sintered component having an impurity component concentration of less than about 400 ppm.
2. The method of claim 1, wherein sintering is performed under a vacuum pressure of less than about 10 torr for at least about two hours.
3. The method of claim 1, further comprising washing the sintered component with an acid solution.
4. The method of claim 3, wherein the acid solution comprises at least one acid selected from the group consisting of hydrochloric acid, nitric acid, and hydrofluoric acid.
5. The method of claim 1, further comprising forming at least one feature on the molded component.
6. The method of claim 1, further comprising forming at least one feature on the sintered component.
7. The method of claim 6, further comprising forming an oxide layer on a surface of the sintered component.
8. The method of claim 7, wherein forming the oxide layer comprises heating the sintered component at a temperature of about 1000° to about 1300° C under an oxidizing atmosphere.

9. The method of claim 8, wherein the oxidizing atmosphere comprises oxygen and at least one chlorinated species selected from the group consisting of chlorine, hydrogen chloride, dichloroethylene, and trichloroethane.
10. The method of claim 7, further comprising removing the oxide layer from the sintered component.
11. The method of claim 10, wherein removing the oxide layer comprises washing the sintered component with an acid solution.
12. The method of claim 11, wherein removing the oxide layer further comprises rinsing any acid from the sintered component with water.
13. The method of claim 1, wherein sintering is performed until at least a portion of the sintered component has a pore size of at least about 15 μm .
14. An article comprising a ceramic material selected from the group consisting of silicon carbide, silicon nitride, and aluminum oxide, the ceramic material having a pore size of at least about 15 μm and an active impurity component at a concentration of less than about 400 ppm.
15. The article of claim 14, wherein the active impurity component can migrate to a semiconductor wafer during semiconductor wafer processing.
16. The article of claim 14, wherein the active impurity component comprises at least one metal selected from the group consisting of iron, copper, nickel, and chromium.
17. The article of claim 16, wherein the concentration is less than about 200 ppm.

18. The article of claim 17, wherein the concentration is less than about 100 ppm.
19. The article of claim 18, wherein the concentration is less than about 50 ppm.
20. The article of claim 19, wherein the concentration is less than about 10 ppm.
21. The article of claim 20, wherein the concentration is less than about 1 ppm.
22. The article of claim 14, wherein the ceramic material comprises recrystallized silicon carbide.
23. The article of claim 14, wherein the ceramic material further comprises an inert impurity component.
24. The article of claim 14, wherein the article is a wafer boat and the ceramic material comprises silicon carbide.
25. A method of fabricating a component of a wafer boat comprising:
providing a molded component comprising a ceramic selected from the group consisting of silicon carbide, silicon nitride, and aluminum oxide;
sintering the molded component at a temperature of about 2200° to about 2500° C to form a sintered wafer boat component;
washing the sintered wafer boat component with an acid solution comprising at least one acid selected from the group consisting of hydrofluoric acid, hydrochloric acid, and nitric acid; and
rinsing the sintered wafer boat component with water.
26. The method of claim 25, further comprising forming at least one surface feature on the sintered wafer boat component.

27. The method of claim 26, further comprising forming a first oxide layer on a surface of the sintered wafer boat component and removing the first oxide layer from the surface of the sintered wafer boat component.
28. The method of claim 27, further comprising forming a second oxide layer on a surface of the sintered wafer boat component and removing the second oxide layer after forming and removing the first oxide layer.
29. The method of claim 25, wherein sintering is performed until at least a portion of the wafer boat component has a pore size of at least about 15 μm .